German Patent No. 3,445,976 A1
(Offenlegungsschrift)

Translated from German by the Ralph McElroy Co., Custom Division
P.O. Box 4828, Austin, Texas 78765 USA

Code: 973-49729

FEDERAL REPUBLIC OF GERMANY

GERMAN PATENT OFFICE

PATENT NO. 3,445,976 A1

(Offenlegungsschrift)

Int. Cl.[4]:	E 01 C 13/00 A 83 C 19/10
Application No.:	P 34 45 976.6
Application Date:	December 17, 1984
Publication Date:	October 10, 1985
Priority:	
Date:	April 2, 1984
Country:	Italy
No.:	47977A84

SKID TRACK AND METHOD FOR ITS PRODUCTION

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Search results pursuant to § 43, Paragraph 1, Patent Law:

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The invention relates to a synthetic skid track that does not use ice.

This track consists of plastic and has a hydrophobic substance, selected from saturated hydrocarbons and similar materials such as waxes, polymers, and copolymers of the group consisting of ethylene, propylene, butylene, and mixtures of these, which have a melting point between 30°C and 130°C.

To improve the sliding properties, a liquid is sprayed on it.

Claims

1. Skid track arrangement of a plastic structure that is a type without ice, characterized by a skid track surface consisting of a hydrophobic substance selected from saturated hydrocarbons and similar materials such as waxes, polymers, and copolymers of the group consisting of ethylene, propylene, butylene, and mixtures of these, with a melting point between 30°C and 130°C (86°F and 266°F), preferably between 65°C and 100°C (149°F and 212°F).

2. Arrangement according to Claim 1, characterized by the fact that the surface of the hydrophobic substance can be sprayed with a liquid.

3. Arrangement according to Claim 2, characterized by the fact that the liquid selected is from the group consisting of water, water-soluble alcohols and polyalcohols, water-soluble glycols and polyglycols, and mixtures of these.

4. Arrangement according to Claim 2, characterized by the fact that a surfactant is added to the liquid.

5. Arrangement according to Claim 1, characterized by the fact that this hydrophobic substance is a mixture of paraffin waxes-polyethylene.

6. Arrangement according to Claim 5, characterized by the fact that the mixture, paraffin wax-polyethylene, consists of 100-70% paraffin wax, and accordingly 0-30% polyethylene, particularly 90% paraffin wax and 10% polyethylene.

7. Arrangement according to Claim 1, characterized by the fact that the structural group includes a substrate on whose surface this hydrophobic substance is laid down in a partial

fusion process, and in this way forming an intermediary layer, with these two materials penetrating from opposite sides.

8. Arrangement according to Claim 7, characterized by the fact that the substrate consists of material selected from the group

- asphalt with sharp-edged crushed stone on the surface,
- porous, fire-resistant materials,
- sintered materials,
- conglomerates of low density, and
- mineral-type foams, known in the construction industry.

9. Method for the production of a synthetic track that is to be run with skids, a so-called [illegible; possibly, "synthetic] ice skating rink," characterized by the fact that

- a packed rock bed is constructed on bare ground,
- a substrate according to Claim 7 is formed on this bed,
- and on the surface of the substrate, the hydrophobic substance according to Claim 1 is applied, whereby an ice skating jacket is formed.

10. Method according to Claim 9, characterized by the fact that the step involving the application of the hydrophobic substance includes the following phases:

A) forming of the hydrophobic substance selected according to Claim 1 into bricks, stones, or sheets,

B) covering of this preheated carrier substrate with these bricks, stones, or sheets, after which their underside is exposed to a heat source such that a jacket of stones or sheets is formed, and that

C) the jacket of stones or sheets is heated in order to melt the surface and to obtain a continuous surface from a discontinuous surface of stones or sheets.

11. Method according to Claim 9, characterized by the fact that as a further step, a liquid is distributed on the surface of this (ice skating) jacket.

12. Method according to Claim 9, characterized by the fact that a hygroscopic substance is distributed on the surface of the (ice skating) jacket.

The invention relates to a track that is suitable for running with skids, a so-called synthetic (ice skating) track for ice skates, skis, and bobsleds, which can be used at ambient temperatures considerably above 0°C (32°F). In particular, the invention relates to a synthetic (ice skating) track set that makes it possible to replace the customary ice skating tracks and roadways, which currently are being used for running with skids, and for driving with skis, skeletons, and bobsleds.

Attempts to use floors that replace ice as ice skating tracks for ice skates, which have blades, have been rare and disappointing.

It is known that synthetic floors for ice skating that are constructed from hydrocarbon-polytetrafluoride sheets (trade name, Teflon) have already been used.

However, even though this material proved to be rather satisfactory with respect to the response to the effects of ice skates, it suffers from the fact that it is particularly expensive and the original surface smoothness cannot be restored,

so that after wear, the floor of hydrocarbon-polytetrafluoride must be replaced.

These disadvantages in ice skating tracks are to be avoided through a synthetic ice skating track set according to the invention, which does not have the technical disadvantages that such known synthetic ice skating tracks have: in the process, low installation and servicing costs can be assured in order to easily, quickly, and economically restore the original, undamaged state at any time at which this appears necessary and/or desirable.

In order to achieve these goals, saturated hydrocarbons and similar materials are surprisingly proposed according to the invention, as they generally are included in the class of waxes, paraffins, polymers, and copolymers of the series that includes ethylene, propylene, butylene, etc., and mixtures of these, whereby their melting points are within the range of 30-130°C (86-266°F), particularly 55-100°C (131-212°F).

Preferably, the above-named substances and/or mixtures of these are composed of plastifiers, antioxidants, and possibly ultraviolet radiation protection agents. The selection of these materials and mixtures was made after consistent theoretical and experimental research, which was necessary because the material for the ice skate or sliding surface of skids "ice" tracks had to fulfill the terms of a sensible compromise between the following requirements:

A) It must be in a solid state and result in the desired properties at ambient temperatures, for which an upper limit of 40°C is regarded as sensible.

B) It must be hydrophobic.

C) It must make possible a certain degree of penetration of the blade edge of the ice skate. This is an important feature when turns are to be made, or leaps or the like, specific to this sport, because the centrifugal forces must be counteracted.

D) The edges of the tracks or of the traces left by the ice skate blades must be soft because otherwise, with repeated crossing of the same surface of the track, a considerable reduction in maneuverability and smoothness when skating over is not guaranteed.

E) Under the conditions for ice skating, the grooves cut in by the ice skates should not be too deep or, better stated, the energy required for the necessary grooves must be relatively slight, because this amount of energy is lost from the sliding process.

F) The surface of the ice skating track must be capable of being restored to the starting condition by means of normal servicing procedures, that is, without the necessity for replacing the floor or surface. In this connection, the restoration is obtained according to the invention in that a thin surface layer is melted in order to make possible a filling of the grooves and the flattening of the edges during the ice skating. Under these conditions, the "restorability" is inversely proportional to the volume of the grooves and to the difference between the melting point and the ambient temperature.

The required hydrophobic character is common to all materials that have only small volume fractions of any kind of functional groups or that avoid them, that is, those that maintain their hydrophilic character, such as -OH, -COOH, -CN, $-NH_2$, etc., or any kinds of dipoles. This hydrophobic character

is common to the hydrocarbons, paraffins, or polymers and copolymers of the series consisting of ethylene, propylene, butylene, etc., polystyrene, hydrocarbon polytetrafluorides, silicones, and polyvinyl chloride, although not to the same extent.

Nevertheless, many of these materials can be excluded because they cannot restore the ice skating track or roadway grooved by ice skates, so they are impractical. The materials excluded for this reason are, for example, hydrocarbon polytetrafluorides, silicones, and generally the polymers that can be heat-hardened. These materials cannot melt without decomposition.

For the goal of the invention involving an ice skating track or roadway for blade skids or ice skates, which is the practical equivalent of ice skating tracks or ice-running surfaces, the mixtures of paraffin wax with a melting point (m.p.) of 56-58°C (132.8-136.4°F) with polyethylene of low density have proven to be particularly suitable in tests.

Preferably, a mixture of 90% paraffin wax and 10% polyethylene with a melting point between 70-75°C (158-167°F) fulfills this requirement. The following description will be given with reference to such a mixture.

It is known that any arbitrary sports field, any track, or any sports surface involves a bed of densely packed material, so that the tests involved take place directly below the jacket that forms the synthetic ice surface. This material layer, which is called the substrate, must assure complete adhesion of this "jacket," which apparently may not move either horizontally (sliding) nor vertically (become loosened).

The solution to both problems was found, after repeated tests, in that a connection element of principally mechanical nature was produced between a rigid substrate and sheets or bricks of the selected hydrophobic substance. Such a substrate is formed, according to an economical design, by a pavement of stones, of mineral foam, as normally used in housing construction. A thin layer of the underside of each stone or "brick" is brought up to the melting point, for example, by the direct radiation of a flame, and is then pressed for several seconds against this pavement of mineral foam, which has been locally preheated so that the surface is at approximately 100°C (212°F). The mixture forming the stone or brick partially penetrates into the cavities, scratches, and porosities of the stones or bricks and thus forms an intermediary layer of mutual interpenetration. In this manner, the stresses and strains that appear in the jacket due to temperature changes, which convert into horizontal and vertical forces, are evenly distributed over the entire surface of the track.

In this manner, any concentration of tension that could generate macroscopic fissures and cleavages is prohibited.

Because the hydrophobic material of the jacket is in the form of bricks or stones that can freely undergo a decrease in temperature from the melting point to the ambient temperature, it happens that under working conditions the same material is only stressed in combination with, and within the range of, the fluctuations of the ambient temperature.

Experience has shown that bricks or stones consisting of a mixture of paraffin wax-polyethylene (90-10%), arranged at an ambient temperature of 22°C (71.5°F) on a substrate of bricks

consisting of a mineral foam, neither became loose nor were torn when the arrangement was brought to 40°C (104°F), then reduced to 0°C (32°F).

In general, for the formation of the substrate of the track, suitable materials are those that are porous and that make possible the formation of an intermediary layer for copenetration from the opposite sides.

In order to assure the possibility of restoration of the ice skating surface after it has been grooved by the edges of the ice skates, the selection was made for mixtures containing paraffin wax as already stated.

The restoration was achieved by the invention in that the surface was heated so that the surface layer melted. The flowing of the molten layer eliminated any edges, tracks, grooves, or recesses caused by the effects of the ice skates.

According to the invention, the nature and manner by which the jacket surface of the ice skating track is melted is not critical; however, it is desirable that a high-temperature source be used, such as a direct flame or an electrical resistance device that can be brought to the glowing state, so that from a short distance radiation can be conducted over the surface to be restored from a short distance.

It is absolutely necessary, according to the invention, that the ice skating track surface be sprayed, possibly with the addition of a surfactant, with a liquid, preferably water, during the practice [of ice skating]; this liquid does not necessarily have to be a lubricant.

A simple method for keeping the synthetic track surface continuously wet consists of distributing over it a suitable

quantity of intensely, hygroscopic, powdered substance such as magnesium chloride.

Through the measures according to the invention, therefore, a jacket of paraffin materials is bonded to a suitable substrate, whereby a liquid, preferably water, is sprayed over the ice skating track surface.

For example, embodiment forms of the invention will now be explained in more detail with reference to the attached drawings. These show in:

Figure 1, a partially cut, perspective view of a synthetic ice skating track according to the invention;

Figure 2, a similar representation of a detail, before pouring of the intermediary compounds of the sheets;

Figure 3, a similar representation of the finished construction; and

Figure 4, another detail of a sheet according to a preferred embodiment form of the invention.

According to Figure 1, the ice skating structure according to the invention includes bed 10, substrate 11, and jacket surface 12. Stone bed 10 is enclosed by guard rail 16, preferably made of cement so that a casting gutter 18 runs around it. The latter is covered by grid 19. The construction is completed by railing 20, which has impact-resistant strip for ice skates 21, fastened to vertical posts. Finally, there is circumferential passage 23.

The general method for production of the synthetic ice skating track structure of the type just indicated is as follows:

1. Construction of a closely packed stone bed on a bare foundation.

2. Construction on such a stone bed of a highly porous substrate to hold the synthetic ice skating track jacket as described above.

3. Application of the ice skating track jacket in the form of sheets, stones, or bricks, corresponding to the above-described technique.

Regarding the thickness of the jacket track, at present, 15 mm (9/16 in) suffices.

In this manner, the jacket thickness can be enlarged after the final construction, in that material can be added successively. This is done by the spreading of flakes or grains of this hydrophobic material, which was obtained from mixtures of paraffin wax and polyethylene as described above. Subsequently, the melting procedure is performed according to the same criteria as those described above for the restoration of the synthetic track surface.

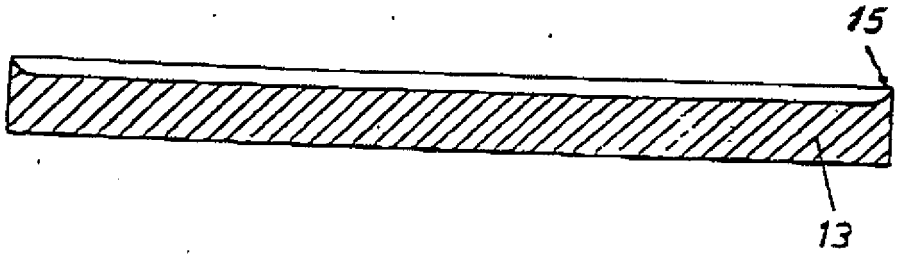
It is noted that this method of the successive addition of layers of synthetic track jacket, whereby the selected substance is applied in the form of flakes or grains that are to be melted, can also be performed to apply the jacket entirely to the substrate.

In summary, it can be stated that through the measure according to the invention, it is shown how skid tracks and surfaces without ice can be produced, which make it possible to perform ice skating for reasons of sports, artistic presentations, or simply for entertainment, or also to produce roadways for skis, skeletons, bobsleds, and the like. In order to construct the latter, the tracks must be applied to inclined surfaces. Their structure per se differs, whereas the nature of

the ice skating track jacket made of the materials indicated above, and which are then laid down on their substrate in each case, remains the same.

Finally, the substances that form the jacket may, as mentioned, have an addition of antioxidants, such as phenyl-1-naphthylamine or aryl phosphites; for tracks in the open air, substances that are known as protectants against ultraviolet radiation, for example, derivatives of 2-hydroxybenzophenone, may be used. Additives of softeners are also possible; among these, the mixed polymerizates of ethylene-vinyl acetate can be named. Elastifiers, solvents, and lubricants can also be added.

FIG. 4



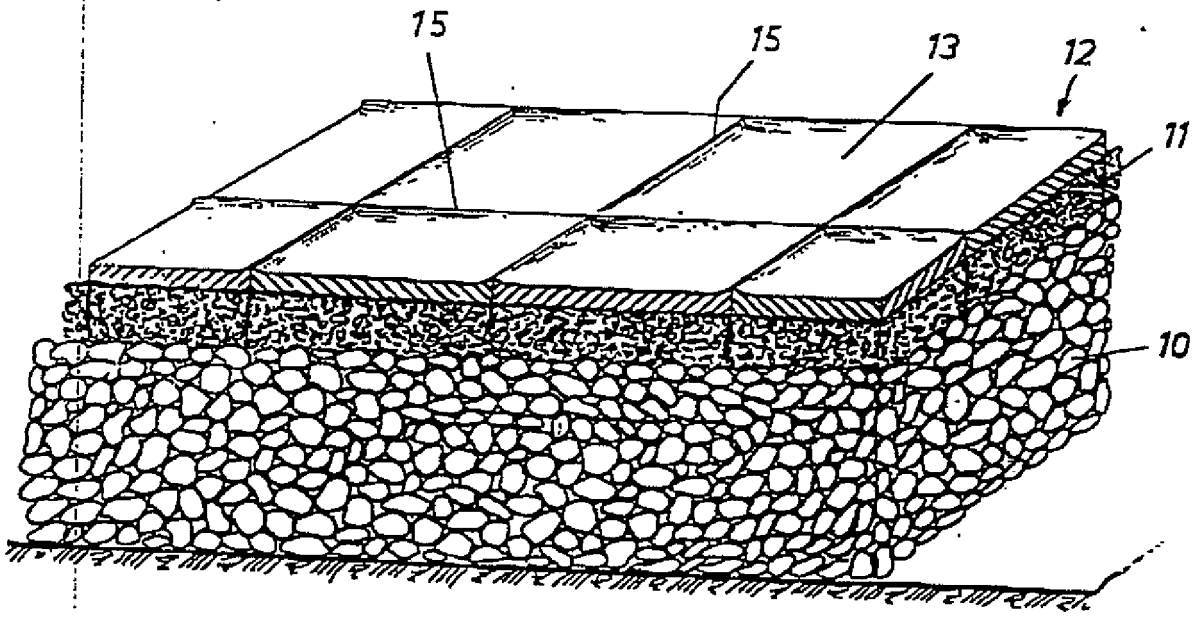


FIG. 2

Nummer: 34 45 976
Int. Cl.³: E 01 C 13/00
Anmeldetag: 17. Dezember 1984
Offenlegungstag: 10. Oktober 1985

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FIG. 1

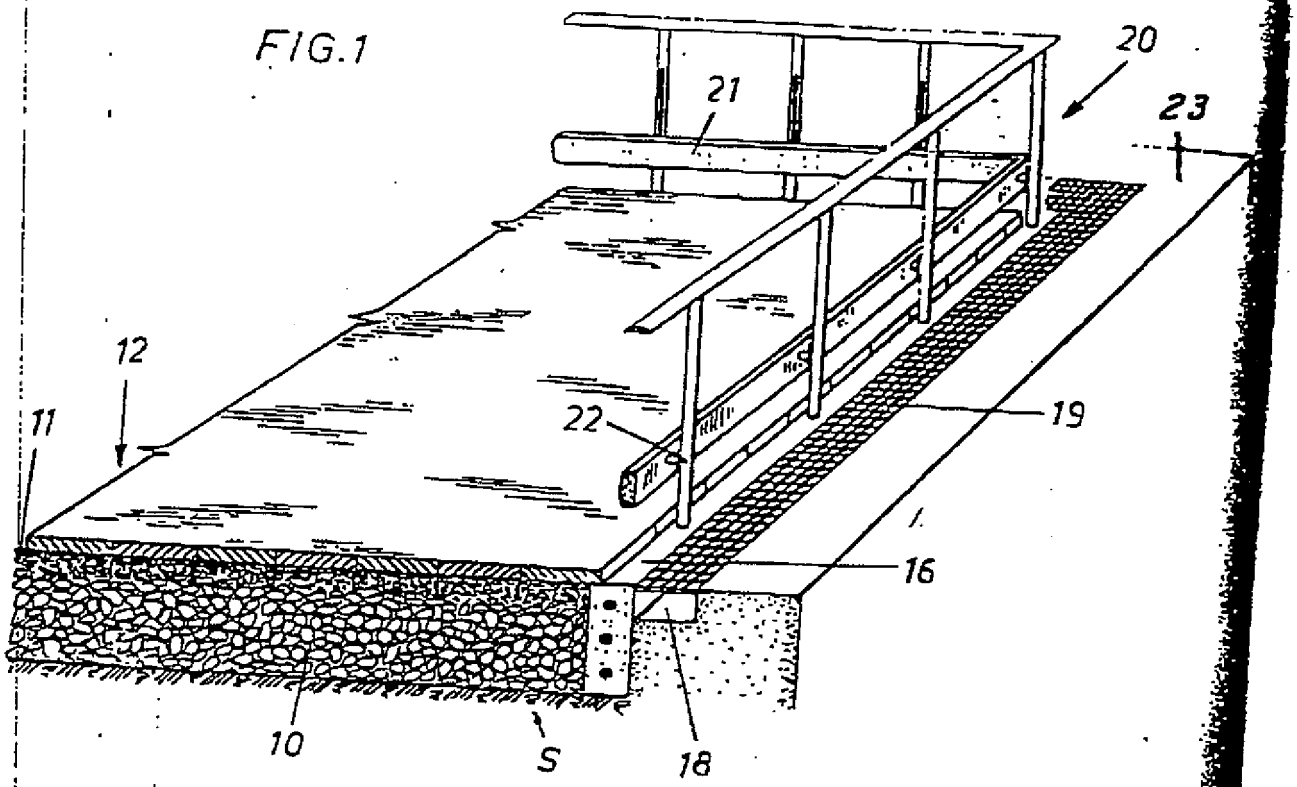

FIG. 3